# What value do computers provide to NHS hospitals?

Chris Lock

**As the NHS spends around £220 million a year on information technology for use by acute hospitals that are hard pressed for resources, it is reasonable to ask what value is provided. A review of rigorous scientific evidence for the value of information technology to NHS hospitals found that published evidence is scarce and far from conclusive. Information technology in NHS hospitals needs further assessment so that future decisions on such necessary and important investments are based on clear, well documented experience and research.**

**Potential benefits from information technology systems in hospitals**

*Referral to or attendance at casualty department*
- Easier access to medical history

*Outpatient clinic*
- Improved access to summary patient details
- Easier production of clinic letter to general practitioner

*Admission*
- Improved access to summary patient details
- Support for protocols or guidelines
- Easier access to results of investigations
- Quicker reporting of results of treatment

*Discharge*
- Easier generation of discharge summary for general practitioner
- More reliable data to support audit
- Shared care better supported with community based professionals

Recent reports from the Audit Commission have criticised the use of computer systems in NHS hospitals[1 2] and have sparked a debate regarding the value of information technology to the NHS and to acute hospitals in particular. The costs are substantial (£220m a year), and some argue that the benefits are nebulous and diffuse. But where is the evidence?

Assessing the value arising from investments in information technology, rather than merely their cost, is not straightforward. Much information technology investment has been in administrative systems that might be regarded as successful when they save money.

Recent thinking suggests that this is insufficient, and that a more comprehensive assessment should consider whether information technology supports the commercial and strategic objectives of the organisation.[3 4] For the NHS, the impact of computer systems on patient care as well as on the "business" objectives of hospitals should be considered.

When computer systems are assessed against patient care objectives, outcomes should be expressed as would those arising from other clinical interventions. The range of outcomes that might arise from computer systems is potentially huge, and as yet no measure of outcome has been universally recognised. The Audit Commission offered a list of potential clinical benefits of information technology to patient care (box), which illustrates the breadth of potential benefits.

## Method

By using computer and manual methods, searches were conducted for published information about hospital information technology systems that had undergone refereeing or peer review and contained sufficient detail to enable the value of the investment to be considered. The search included papers from medical and scientific journals, the proceedings of the annual British healthcare computing conference, and assessments published by the NHS Executive Information Management Group[5] and individual hospitals.

Appropriate publications, from 1990 to July 1995, that described hospital or departmental systems in use in the NHS were identified by a methodical keyword search procedure. Full details of the method used are available on request.

### ANALYSIS

A structured method of analysis was developed to assess the level of detail presented in the paper in an objective and replicable manner. Papers that gave sufficient detail to allow at least a provisional assessment of the value of the information technology system were separated from those that were essentially discussions or descriptions of systems or commentaries on such systems.

The criteria in table 1 were used to assess the level of detail. The criteria focus on the investment made or resources consumed by the information technology project and on the advantages or improvements realised as a result of the project or system, whether clinical, administrative, or financial. The criteria recognise that benefits are generally more difficult to quantify than costs, and that benefits are even harder to translate into financial terms. Also, the criteria accommodate statements of benefits that arise from qualitative assessments. Reports that contained cost or benefit information that was sufficiently quantified (level 5 or 6) were identified for further analysis.

## Results

Only 55 papers were found when the criteria for level of detail were applied to the data in papers found through Medline and the Bath Information and Data Service (BIDS)(table 2). Of these, just six concerned hospital systems in use in the NHS.[6-11] Only one of these papers—from the Royal Hampshire County Hospital, Winchester[7]—gave details of costs or benefits to the required detail (level 5 or 6). Of the 465 papers given at the annual conferences on healthcare computing, 40 described hospital or departmental systems in use[12-51]; of these, seven papers described six cases with details to the required level (table 2).[22 35 36 39 41 42 45]

A further nine cases were identified in five publications from the NHS Executive and other sources.[52-56] After duplicates were removed, published information on the value of information technology consisted of cases from 12 hospitals. Table 3 summarises the key data on costs and benefits given in these cases.

**Clinical Operational Research Unit, Department of Statistical Science, University College London, London WC1E 6BT**
Chris Lock, *principal research fellow*

*BMJ* 1996;312:1407–10

**Table 1**—*Criteria for assessing level of detail provided in published reports of information technology systems in hospitals*

| Level of detail | Information on benefits | Information on costs |
|---|---|---|
| 0 | No information | No information |
| 1 | Areas of potential benefit suggested | Broad areas of expenditure indicated |
| 2 | Description of expected benefits | Estimate of total resources consumed |
| 3 | Identification of areas where benefits have been realised | Total costs given |
| 4 | Some actual benefits quantified (uncosted) | Details of expenditure incurred |
| 5 | Benefits realised to date quantified; areas of potential benefit identified | Details of capital expenditure, with some future areas of costs (for example, maintenance) |
| 6 | Estimate of financial impact of benefits | Detailed capital and revenue costs, including staff costs |

## Discussion

EVIDENCE IS ELUSIVE

Published evidence on the value of information technology in hospitals is scarce and far from conclusive. The systems in these 12 hospitals represent an investment of £54m. It is estimated that, from 1990 to July 1995, the NHS invested £220m a year—a total of over £1000m—in information technology for use by NHS hospitals.[1] These reports describe about 5% of this expenditure, which is a poor indicator of the true value of a large and important national investment.

Such elusiveness of evidence regarding information technology investments is not unusual. A recent review of the European literature also found few evaluation studies of automated information systems in health care.[57] Only 13 of the 108 studies that were identified used any economic analysis. The author found it "astonishing" that so few studies attempted to show cost effectiveness.

In their review of the use of computers by general practioners, Sullivan and Mitchell reported that although 90% of general practitioners in the United Kingdom used computers, and 55% used them during consultations, only 30 studies had been carried out worldwide (between 1984 and 1994). The results were described as not fully conclusive.[58]

Powell noted that evaluation of information technology investments is problematic and complex in a range of industries.[59] Examining the effect of information technology on the economic wellbeing of businesses, Landauer observed that, although service related organisations are those where the greatest productivity gains can be made, they are also where computer technology is sometimes least effective.[60]

**Table 2**—*Cost-benefit evidence in publications found on Medline,* BIDS,† and reports of healthcare computing conferences, 1990-5*

| | Medline (35 papers) | | BIDS (20 papers) | | Healthcare computing conferences (465 papers) | | Total (520 papers) | |
|---|---|---|---|---|---|---|---|---|
| Level of detail | Benefits (1 case) | Costs (1 case) | Benefits (5 cases) | Costs (5 cases) | Benefits (40 cases) | Costs (40 cases) | Benefits (46 cases) | Costs (46 cases) |
| 0 | | 1 | | 4 | 2 | 19 | 2 | 24 |
| 1 | | | | | 3 | 9 | 3 | 9 |
| 2 | | | | | 8 | 3 | 8 | 3 |
| 3 | 1 | | 3 | | 13 | 2 | 17 | 2 |
| 4 | | | 1 | | 8 | 2 | 9 | 2 |
| 5 | | | 1 | 1 | 2 | 2 | 3 | 3 |
| 6 | | | | | 4 | 3 | 4 | 3 |

*Medline is database used by Department of Health; it originates in National Library of Medicine, Bethesda, Maryland, USA.
†BIDS, the Bath Information and Data Service, provides access to Science Citation Index, which includes 4000 journals and comes from Institute for Scientific Information in Philadephia, USA.

**Table 3**—*Summary of evidence regarding value of information technology systems in hospitals*

| Hospital | Type of system | Cost information | Benefit information |
|---|---|---|---|
| Royal Liverpool University Hospital NHS Trust | Human resources[35] | £66 000 over 3 years including staff; 3-4 year payback | 1.5 FTE saving £18 000 annually; automatic contract and letter production |
| Stoke City General Hospital | Respiratory medicine[22 36] | £85 000 over 3 years including staff | Reduced paperwork, better practice, patient benefit |
| St David's Hospital, Carmarthen | Distributed PAS[41] | £339 000 capital plus £30 000 revenue costs | £126 000 annual savings by replacing previous system |
| Salford Royal Hospital NHS Trust | District diabetes system[45] | £15 000 annually for first 2 years, then £10 000 annually | Improved patient management, reduced consultation time, improved audit and planning |
| Clwyd Health Authority | HISS[55] | £9.85m over 3 years; 4-5 year payback on PAS | £643 000 saved over 2 years. Improved quality of data and administration |
| Greenwich Healthcare NHS Trust | HISS[39 52 53] | £6.75m capital plus £5.77m revenue over 7 years | Savings in pharmacy (£40 000 annually) and radiology (£86 000 annually); benefits to nursing and administration |
| Wirral Hospital NHS Trust | HISS and resource management[42 54 56] | £14.43m gross over 8 years | Savings of £4.94m over 8 years* |
| Royal Hampshire County Hosptial, Winchester | HISS and resource management[7 56] | £5.796m capital and implementation† | 5 FTE saved in clerical functions, 19 hours/week saved on ward handover, time saved on drug rounds* |
| Freeman Hospital, Newcastle | Resource management[56] | £1.9m capital and implementation† | |
| Guy's Hospital, Lewisham | Resource management[56] | £4.2m capital and implementation† | |
| Royal Infirmary, Huddersfield | Resource management[56] | £2.8m capital and implementation† | |
| Pilgrim Hospital, South Lincolnshire | Resource management[56] | £1.77m capital and implementation† | |

FTE=full time equivalent staffing; PAS=Patient Administration System; HISS=Hospital Information Support System.
*Resource management has shown service production benefits and a number of positive changes in care delivery. No measurable benefits in patient care were found. Generally positive staff perceptions. Probably better performance than national average, but causation is problematical.
†1989 Prices.

## BENEFITS ARE DIFFICULT TO ASSESS

Where specific productivity or cost effectiveness gains are sought through the use of information technology in hospitals, these can generally be assessed with health economics techniques. When clinical benefits are monitored, techniques such as randomised controlled trials can be considered, but these are inappropriate for assessing most information technology systems and there are difficulties in quantifying improvements and associating them directly with the use of the information technology system. New methods combining economic and clinical evaluation are starting to emerge and should inform the development of methods for assessing information technology systems.[61]

A further difficulty is the lack of clear, specific, care related objectives, which should be identified at the start of an information technology project and against which actual performance can be assessed. This lack of objectives may be one reason that information technology has not been included in the considerations of the NHS's health technology assessment programme. Despite these difficulties, attempts at assessment are made, as the evidence identified by this paper has shown, and these provide a measure of justification for the use of computers in hospitals.

## NEED FOR MORE RESEARCH

If the NHS is to invest effectively in information technology a significant body of evidence must be developed to establish the value to healthcare delivery of different types of system and the most appropriate areas of application. That body of evidence does not currently exist. Wyatt recently pointed out the need for research and evaluation of information technology in hospitals,[62] and these findings support this.

The Audit Commission has estimated that about a quarter of doctors' and nurses' time is spent collecting data and using information, which means that about 15% of hospital running costs—totalling around £3bna year—is expended on handling information.[1] In this light, the use of modern information technology seems not only appropriate but unavoidable, and annual expenditure of £220m on hospital information technology seems modest.

Information technology professionals generally take the view that the need for improved systems is self evident in such complex, information intensive organisations as hospitals. Unless the benefits are proved, however, resources may be expended ineffectively. The process should take account of the best previous evidence, which until now has not been identified.

As proposals for information technology systems increasingly seek to produce improvements in patient care, clinicians have a greater part to play in these decisions, which compete for resources directly with investments in treatment and clinical facilities. This emerging requirement can be regarded as parallel to the current debate regarding evidence based medicine.[63 64] Guidelines for the systematic review of research that are being developed[65] may help inform the methodologies for assessment across a wide range of clinical interventions, including the use of information technology systems. Clinicians should seek evidence when they consider investing in information technology as they would for other initiatives.

I gratefully acknowledge the support and assistance of colleagues at the Clinical Operational Research Unit, University College London.

Funding: Financial support for this research was provided by the Department of Health Research and Development Division and Siemens Nixdorf Medical Portfolio.

Conflict of interest: The author is seconded from Siemens Nixdorf Medical Portfolio, which is a major supplier of computer systems to the NHS.

1 Audit Commission *For your information: a study of information management and systems in the acute hospital.* London: HMSO, 1995.
2 Audit Commission *Setting the records straight: a study of hospital medical records.* London: HMSO, 1995.
3 Lock C. *The assessment of IT in the NHS: a series of working papers.* London: Clinical Operational Research Unit, University College London, 1995.
4 Brown A, Remenyi D, eds. *Second European conference on information technology investment evaluation proceedings.* Birmingham: Operational Research Society, 1995.
5 NHS Executive Information Management Group. *Publications list.* Huntingdon: NHS Executive, 1995. (IMG B2094)
6 Parkin A, Northwood H, Erdentug A, Hall AJ. Optical disk archiving using a personal computer: a solution to image storage problems in diagnostic imaging departments. *J Med Engineering Tech* 1990;**14**:55-9.
7 Harrison GSM. The Winchester experience with the TDS hospital information system. *Br J Urol* 1991;**67**:532-5.
8 Donaldson LJ, Thomson RG, Cook A, Raymakers R. 8 years experience of clinical activity in an outpatient fracture clinic. *Injury-Int J of the Care of the Injured* 1992;**232**:363-7.
9 Emberton M, Ellis BW. Clinical Information system that enhances the use of resources in endoscopic prostatic procedures. *Br J Urol* 1992;**70**:634-40.
10 Langley JD, Botha JL. Use of record linkage techniques to maintain the Leicestershire diabetes register. *Computer Methods and Programs in Biomedicine* 1994;**41**:287-95.
11 Robins JB, Anthony GS. Realising the benefits of resource management. *Scot Med J* 1994;**39**:180-4.
12 Dawson DK, Faulkner J. The introduction of an executive information facility in clinical directorates. In: de Glanville H, Roberts J, British Computing Society, eds. *Current perspectives in health computing.* Weybridge: British Journal of Healthcare Computing, 1990:195-202.
13 Goodyear OM. Evaluating integrated medical systems with an expert component. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1991:117-22.
14 Peters M, Clark IR, Parekh J, McCauley BA, Ryan MF, Neuberger JM, Mutimer D. Automatic application of rule-based decision support: a specialist unit investigation manager. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1991:129-36.
15 O'Brien GJ. Organism alert: a computer system for use by the infection-control nurse. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings* . Weybridge: British Journal of Healthcare Computing, 1991:249-59.
16 Bailey A. Benefits realisation: office systems that work. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:10-6.
17 Corbett WA, Thomas P, Berridge D, Idle N, Hungin P, Cann G, *et al.* An open-access gastroscopy clinic made possible by the computer. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:140-5.
18 Wells IG. An assessment of a new approach to data management in the clinical laboratory. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:213-20.
19 Mahadevan C, Bourne A. A ward nursing and management system. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:244-52.
20 Robertson G, Carter NW, Walker MA. A system for staffing-rota generation and audit of staff workload. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:276-81.
21 Beech CA, Evans AH, Hill V, Mali N, Bradbury SP, Pantin CFA. The use of information technology in a department of respiratory medicine. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:310-8.
22 Dangerfield PH, Pearson JD, Hobson CA, LiY, Brodie A, Scutt D, *et al.* The cost benefits of an automated imaging system for topography of the back in scoliosis. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1992:319-28.
23 Gamlin JM, Jones MJ. Development and use of a paramedic information system. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:120-6.
24 Kelly WF, Mahmood R, Arthur M, Kelly M, Scott E. Inner-city deprivation and diabetes control: a computer database. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:127-34.
25 McKinnon I, Long T. An intensive care database. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:135-42.
26 Smith RAJ, Weston Smith SG, Carr R. A clinical information system for haematological malignancies. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:149-54.
27 Vickery KJ, Hanley SP. Computer-based bronchoscopy project. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:159-68.
28 Peel V, Loeb J, Atkinson C, Booth M, Cottrell K, Ellis L, *et al.* Evaluating a large-scale HIS implementation and its value for hospital resource management. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:309-20.
29 Rickards AF. The current and future clinical benefits of HISS. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:321-8.
30 Robson DJ, Joyce BI. The Greenwich hospital information system. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993:329-34.
31 Smith MF, Berry G. Computing at the bedside: portable computers for ward information systems. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings.* Weybridge: British Journal of Healthcare Computing, 1993: 335-40.

32 Thompson BH, Chantry-Price AE. Interfacing a MUMPS-based drug prescribing scheme with other health systems. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1993:434-9.
33 Cook CA, Beresford RA, Dodds SR, Thompson RL. Evaluation of a pen-based method of clinical-data capture. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1993: 641-9.
34 Penn ZJ, Brockman AF, Steer PJ, Blair G, Garber B. Electronic shared care: the optical memory card. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1993:672-9.
35 Haynes RF. HEALTH ResourCe and the Royal Liverpool University Hospital Trust. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:30-5.
36 Beech CA, Evans AH, Whitehurst L, Mali N, Bradbury SP, Baldwin D, *et al*. Evaluation of the use in information technology in a department of respiratory medicine. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:174-81.
37 Young D. Consultants' views on their use of a computer-based medical record system. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:217-22.
38 Buckingham J, Scott S. Contextual factors influencing the "felt-benefit" of a HISS. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:311-6.
39 Dorenfest SI, Charles L, Robson D, Cohen MR. Benefits realisation and re-engineering: essential tools for a successful HISS. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:324-31.
40 Kelly M, Earland R. Getting ready for a HISS. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:348-56.
41 Royce RG. Downsizing to a distributed hospital system: a case study. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:364-9.
42 Spours A, Marsh P. HISS in the Wirral Hospital. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:370-8.
43 Mitchell S, Lee B. Ward information needs review. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:552-7.
44 Lenfestey RS, Hughes DK. Computerised drug prescribing for inpatients at Wirral Hospital NHS Trust. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1994:606-12.
45 Young RJ, McDowell D, Burns E. The Salford district diabetes information system: a tool for continuous audit of a district diabetes care service. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:62-72.
46 Jones RB, Murray K, Gregory R, Titterington DM, McNair FI, Allison SP. Use of 14 years' data from a clinical information system to identify patients at risk of foot ulcers. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:129-35.
47 Davies CA, Morrow L. Developing information systems in an outpatient clinic. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:179-84.
48 Jones A. HISS supporting primary, community, and secondary care. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:199-207.
49 Heyman TD, Hallam CE, Stickland ID, Jackson RRP. The Kingston case notes system: a multi-disciplinary electronic patient record system. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:282-8.
50 Higginson BM. Is voice input to the medical record a realistic option? In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:289-97.
51 White DA, Swann ZPF. The use of information from nursing systems in the care process; the need for a learning model of systems development. In: Richards B, ed. *Current perspectives in healthcare computing: conference proceedings*. Weybridge: British Journal of Healthcare Computing, 1995:428-33.
52 Silicon Bridge Research. *Computers for the care of patients at Greenwich*. Basingstoke: Silicon Bridge Research, 1993.
53 Scott S, Buckingham J. *Life and work in Greenwich District Hospital before and after HISS*. Winchester: NHS Management Executive, 1994 .
54 Richardson K. *Post implementation review—PCIS/IT implementation, Wirral Hospitals Trust, 1989-1994*. Manchester: Coopers and Lybrand Health Information Systems Group, 1994.
55 Health Services Management Unit. *Evaluation of the Clwyd resource management project: third report by University of Manchester Health Services Management Unit, and CSL Ltd, for the Welsh Office NHS Directorate*. Manchester: Health Services Management Unit, 1993.
56 Packwood T, Keen J, Buxton M. *Hospitals in transition—the resource management experiment*. Buckingham: Open University Press, 1991.
57 Van der Loo RP. Overview of published assessment and evaluation studies. In: Van Gennip EMSJ, Talmon JL, eds. *Assessment and evaluation of information technologies in medicine*. Oxford: IOS Press, 1995.
58 Sullivan F, Mitchell E. Has general practitioner computing made a difference to patient care? A systematic review of published reports. *BMJ* 1995;**311**:848-52.
59 Powell P. Information technology evaluation: is it different? *Journal of the Operational Research Society* 1992;**43**:29-42
60 Landauer T.K. *The trouble with computers: usefulness, usability and productivity*. London: MIT Press, 1995.
61 Drummond M. *Economic analysis alongside controlled trials: an introduction for clinical researchers*. York: Centre for Health Economics, 1994.
62 Wyatt JC. Hospital Information management: the need for clinical leadership. *BMJ* 1995;**311**:175-80.
63 Appleby J, Walshe K, Ham C. *Acting on the evidence*. Birmingham: National Association of Health Authorities and Trusts, 1995. (Research paper No 17.)
64 Evidence-based medicine, in its place[editorial]. *Lancet* 1995;**346**:785.
65 NHS Centre for Reviews and Dissemination. *Undertaking systematic reviews of research on effectiveness: CRD guidelines for those carrying out or commissioning reviews*. York: University of York, 1996. (Report No 4.)


*(Accepted 18 March 1996)*

## A PATIENT WHO CHANGED MY PRACTICE

### The patient must come first

It was my first house job. Surgery. I was fresh out of medical school and enthusiastic, a keen but naive young doctor. Fred—we were not allowed to call her anything else—was in her 70s and came from the north east. Admitted under us with abdominal pain, she was soon found to have a large and advanced lung primary.

The prognosis was gloomy. She was awaiting a hospice bed and stayed with us on the ward for a couple of weeks. We had told her our findings. We passed on all the information we thought she would like to know. She seemed to have perfect acceptance. The whole ward loved Fred. Smiling, open. Spare time could always be spent chatting or laughing with her. But where were those stages of grief that I had read so much about. The anger, the denial, the depression ?

Our consultant was new; similarly young and enthusiastic. It was always a brisk, businesslike ward round. There was not much time for non-surgical type problems such as Fred. "Off to the hospice tomorrow Fred, good." Positioned as I was at the head end of the bed, I was the last to leave. In the bustle of the curtains Fred caught my arm. I remember as she looked into my eyes: "There can't have been a mistake, can there ? "

The ward round had rushed on. The next patient was mine to present. The team would be waiting. Surely Fred knew this already. We had already told her. She had accepted her fate. There was nothing else to be said. "No Fred," I said. "There's no mistake." Almost smiling at such an extraordinary idea, I rushed off to join the ward round. I now recall Fred's face dropping. Her final chance of reprieve gone. But more than that. Her last opportunity to tell someone how she really felt. A chance to talk had slipped away. Duty to a consultant coming before the patient. Fred left the next day. She never did show any grief.

Five years later, a more rounded and experienced doctor, I still remember her. I still feel remorse that I wasted the opportunity. I hope that the hospice team made amends. But most of all I remember that duty to patients must come before that to consultants.—ANDREW THORNS *is a senior house officer in Chester*

We welcome filler articles of up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake,* or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk.